

NUCLEAR

INDIA

PUBLISHED BY THE
DEPARTMENT OF ATOMIC ENERGY
GOVERNMENT OF INDIA
VOL. 39/NO.1-2/Jul.-Aug. 2005

BARC - Bhabhatron-1 Telecobalt Machine



The incidence of cancer is seen rising globally. In India, according to current estimates, 800,000 new cases of cancer are diagnosed every year. With an estimated mortality of 5,50,000, it is the third largest killer disease in the country. Nearly 65% of all cancer patients need radiation therapy as part of their treatment protocol. The 300-teletherapy units in the country fall grossly short of the projected need of 1000 such units. The major constraint has been the prohibitive costs of these machines, which hitherto are imported.

To meet the growing demand of teletherapy machines, the Division of Remote Handling & Robotics of the Bhabha Atomic Research Centre (BARC) took up the development of a computerized telecobalt machine with the Tata Memorial Centre, providing expertise on clinical and technical aspects.

The first computerised indigenous telecobalt unit **Bhabhatron-1** has been installed at the Advanced Centre for Treatment, Research & Education in Cancer (ACTREC), a research facility of Tata Memorial Centre at Kharghar, Navi Mumbai. This endeavour will promote further commercial production of such units in India. It will contribute significantly towards improving the teletherapy density in the country to make cancer care more affordable and widely accessible for large number of patients.

The indigenously developed Telecobalt machine **Bhabhatron-1** has been tested as per international guidelines for acceptance testing and quality assurance for telegamma therapy units in terms of electro-mechanical tests, radiation checks and radiation protection survey. Quality Assurance has been done by a team of scientists from BARC and Tata Memorial Centre.

The first technical evaluation of **Bhabhatron-1** suggests that this unit has several features that are comparable to any imported telecobalt machines. However certain features need further refinement and improvement.

This development will thus go a long way in providing the country with a low-cost alternative to the imported machines making cancer care more affordable and accessible to a large number of cancer patients.

SPECIFICATIONS OF TELE THERAPY MACHINE

Source head	Up to 250 RMM
Source to Iso-centre distance	80 cm
Source diameter	2.0 cm
Floor to iso-centre distance	115 cm
Collimator	Field size min: 4 x 4 cm at 80 cm Field size max: 35 x 35 cm at 80 cm Jaws can close to 0 x 0 cm Rotation: $\pm 90^\circ$ from its central axis Field size indicator: digital display Field size adjustment: motorized
SSD Indicator	Optically projected over the field under treatment (60-100 cm)
Patient Couch	Iso-centric Patient Couch have the following motions: Vertical: 68 cm to 168 cm from floor Longitudinal: 70 cm Lateral: ± 24 cm Couch rotation: $\pm 95^\circ$
Control console	Digital displays indicating exposed time and set time Source position indicator On/Off Switch Emergency stop switch. Patient and treatment database Treatment data interlock Interlocks for Wedge, Shielding Tray and Tissue Compensator Gantry, Collimator and Couch motions
Couch control panel	Gantry, Collimator and Couch motions Room lights, Laser lights and Emergency Stop Switch
Beam modifying devices	Beam shaping blocks of various sizes Wedge filters: 15, 30, 45 and 60° Breast treatment device
Automatic collimator closure	Will close the Collimator jaws to Zero Field size in case of source movement irregularities